

# Changing Skies Over Central North Carolina

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NOAA'S NATIONAL WEATHER SERVICE RALEIGH, NC

## April Tornadoes Rock North Carolina

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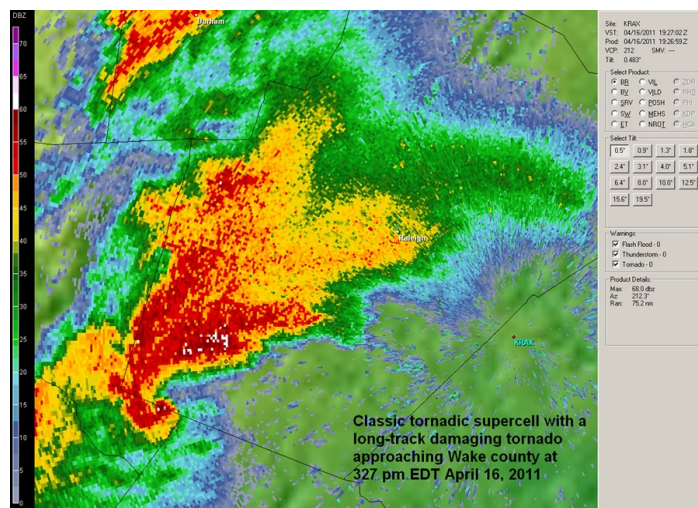
Damage in Sanford, NC from April 16th Tornadoes

Although severe weather was expected on Saturday April 16th as early as 4 days prior, it really wasn't until the 14th that we seriously began to talk about the possibility of a high-impact tornado outbreak occurring in the Carolinas. Severe weather outbreaks are common during the spring months when the necessary "ingredients" are more likely to be in place; however, outbreaks in North Carolina are typically limited by the presence of marginal atmospheric instability. By the morning of the 15th, model guidance began to indicate a very unusual synoptic pattern developing across the Carolinas. A strong upper level trough and associated cold

front were expected to cross central North Carolina during peak heating on the 16th, in the presence of both strong low level wind shear and moderate instability. On the afternoon of the 15th, the

SPC issued a Moderate Risk for severe weather across the Carolinas on the Day 2 Outlook and the Raleigh NWS updated media briefings, hazardous weather outlooks and forecast discussions to reflect the unusual variety of severe weather expected across central North Carolina on Saturday, April 16th. Plans for additional staffing on Saturday had been discussed throughout the week, and by Friday it was determined that 9 meteorologists would be on shift instead of the typical 3.

By late Saturday morning, a line of thunderstorms had already developed in the western Carolinas, an ominous sign for central North Carolina. Shortly after noon, (continued on page 6)





*"The expectation is 12-18 storms, with 6-10 of those storms becoming hurricanes, including 3-6 major hurricanes with winds above 111 mph."*



## Tropics Expected to Remain Active This Year

With 19 named storms, 12 hurricanes, and 5 major hurricanes, 2010 was the third most active Atlantic hurricane season on record. The increase in activity was due to a favorable environment for tropical development. Record warmth in the Atlantic Ocean and light upper level winds due to La Niña conditions in the Pacific Ocean provided the necessary support for a busy tropical season. Despite the high number of storms, the season had little impact on US coastlines. Atmospheric steering led most of the Atlantic storms to re-curve over the Atlantic Ocean and the Caribbean storms to follow more southern tracks into Mexico and Central America.

North Carolina had a close brush with Hurricane Earl in early September 2010. Hurricane watches were hoisted for the North Carolina coast on Aug 31, followed by warnings on Sept 1, as Earl neared. The

storm passed 55 miles offshore early on Sept 3 as a category 2 storm. A wind gust of 66 mph was recorded at the National Ocean Service station in Hatteras. Ocracoke and Hatteras Islands were under mandatory evacuation orders. In addition, Highway 12 was closed. Fortunately, most of the reported damage was minor.

Another active hurricane season has been forecasted by NOAA's Climate Prediction Center. The expectation is 12-18 storms, with 6-10 of those storms becoming hurricanes, including 3-6 major hurricanes with winds above 111 mph. An average Atlantic season would have 11 named storms, 6 hurricanes, and 2 major hurricanes. Similar to last season, warm Atlantic sea surface temperatures (SSTs) and low wind shear will help to support above



**Hurricane Earl (2010)**

average tropical development.

Will the U.S. coastline get through another season relatively unscathed? Although it is not possible to accurately predict landfalls this far in advance, an increase in activity does bring about a greater chance of seeing a landfall in a given year, which makes this a good time to complete your hurricane season preparations.

**-Shawna Cokley**

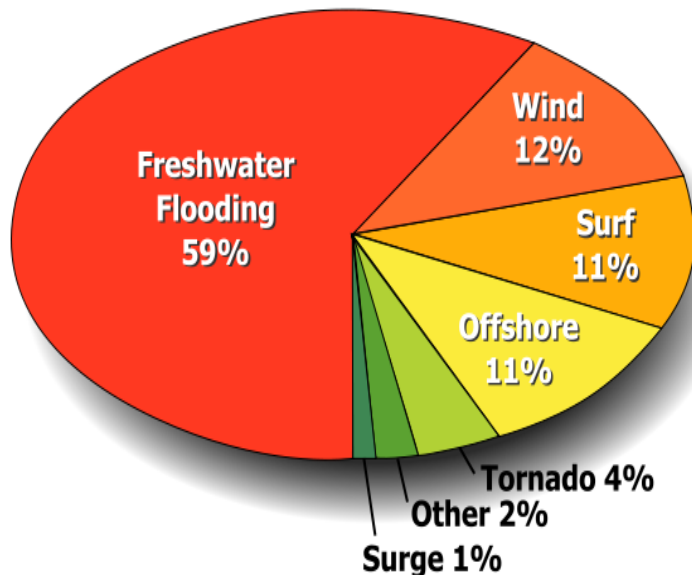
## Preparedness Key in Reducing Risk From Hurricanes

As summer approaches, thoughts of vacations, lazy days by the pool, trips to the beach and time with family and friends is on everyone's mind, but we should also take a moment to think about hurricanes. Ever since the first expeditions to Roanoke Island landed in 1586, hurricanes have been recorded in

North Carolina, shaping our history. North Carolina's unique geography with respect to its coastline makes the state a favorable target for hurricanes. Statistically, North Carolina is overdue for a hurricane impact and perhaps even a major hurricane the intensity of Hurricane Fran. On average, North Carolina

will experience a hurricane every 3 to 4 years. Hurricane Earl in 2010 was the last hurricane to impact the coast and Hurricane Isabel in 2003 was the last hurricane to make landfall in the state. A major hurricane with winds in excess of 111 mph occurs about every 12 years. Hurricane Fran, which hit the coast and

## Leading Causes of Tropical Cyclone Deaths in the U.S. 1970-1999



Source: Edward Rappaport—Chief, Technical Support Branch, Tropical Prediction Center

moved inland in 1996, was the last such hurricane.

With such a high return rate of tropical storms and hurricanes, it is important to know a major disaster could come in any year. Being prepared as individuals, families, and communities is everyone's responsibility. Our increasing dependence on utilities, daily services and increasing development over the last 20 years has increased our vulnerability to major disasters. It is critical for families and businesses to take time and plan for disaster by assembling disaster kits.

The North Carolina Division of Crime Control and Public Safety has developed a one stop shopping website providing disaster preparedness information at <http://www.readync.org/>.

Recommendations from the NCReady website include making sure you know your evacuation routes and local shelters.

Listen for watches and warnings issued by the National Weather Service as the storms approach.

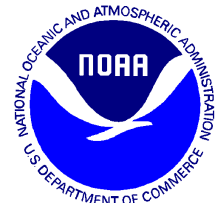
Put fuel in all vehicles and withdraw some cash from the bank. Gas stations and banks may be closed after a hurricane. If authorities ask you to evacuate, do so promptly. If you evacuate, be alert to flooded or washed-out roads. Be sure to keep a photo I.D. that shows your home address.

There is never enough time to get ready for a disaster. In order to give yourself and your family a head start, assemble a disaster supply kit including many items which you already have around the house. Also be sure to locate all important documents and take them with you if there is a need to evacuate.

-Jeff Orrock

### Hurricane Preparedness Kit Essentials

- Water - 1 gallon per person per day
- Water purification kit or bleach
- First aid kit and first aid book
- Pre-cooked, non-perishable foods, such as canned meats, granola bars, instant soup & cereals, etc.
- Baby supplies: formula, bottle, pacifier, soap, baby powder, clothing, blankets, baby wipes, disposable diapers, canned food and juices
- Non-electric can opener
- Anti-bacterial hand wipes or gel
- Blanket or sleeping bag per person
- Portable radio or portable TV and extra batteries
- Flashlight and extra batteries
- Essential medications
- Extra pair of eyeglasses
- Extra house and car keys
- Fire extinguisher - ABC-type
- Food, water, leash and carrier for pets
- Cash and change
- Seasonal change of clothing, including sturdy shoes







**“On April 16, 37 tornado warnings were issued for central North Carolina from the Raleigh office. Preliminary statistics show that the accuracy of the warnings was almost 100%.”**



## NWS to Conduct Service Assessment for April 16th Tornadoes

The National Weather Service (NWS) conducts service assessments to evaluate its performance after significant hydrometeorological, oceanographic, or geological events resulting

port, which serves as an evaluative tool to identify and share best practices in operations and procedures, and identify and address any service deficiencies.

The goal of the activity is for the NWS to continuously improve its services to the nation. Since 2000, 23 service assessments have been completed and published on the NWS service as-



**Damage along Saunders Street in Raleigh**

in warning or other operational activities. Assessments may be initiated when one or more of the following criteria are met:

- Major economic impact on a large area or population
- Multiple fatalities or numerous serious injuries
- Extensive national public interest or media coverage
- Unusual level of attention to NWS performance

Assessment teams, composed of experts from within and outside the NWS, evaluate activities before, during, and after events to determine the usefulness of NWS products and services. Finally, the team generates a re-

assessments web page, <http://www.weather.gov/os/assessments/index.shtml>.

The most recent service assessment published on the web site was the record floods of greater Nashville, including flooding in middle Tennessee and western Kentucky, in May, 2010. The NWS is currently conducting a service assessment of the tornadoes that affected several parts of the U.S. in April and May, including North Carolina April 16, tornadoes that affected the Gulf Coast states in late April, and the Joplin, MO tornado of May 22.

On April 16, 37 tornado warnings were issued for central North Carolina from the Raleigh office. Preliminary statistics show that the accuracy of the warnings was almost 100%.

25-30 minutes of lead time was provided for the town of Sanford, where a Lowe's home improvement store suffered EF3 damage, and a store manager and other employees shepherded staff and customers to safety, prompting a congratulatory call from the President of the United States according to news reports. In addition to the Lowe's, Dorton Arena on the North Carolina State Fairgrounds sheltered and evacuated, the North Carolina State University spring football game was stopped in the third quarter to allow thousands of spectators to get home to safety, and an air show at Seymour Johnson Air Force Base, also with thousands vulnerable outdoors, was cancelled around noon due to the forecast. While eight individuals perished due to the storms on April 16 in central North Carolina alone, a testament to the fact that science and communication still need to be improved when it comes to tornadoes, accurate, timely, and detailed forecasts and warnings likely kept the toll of injuries and fatalities from being much higher. Certainly all of us at the Raleigh office, and across the NWS, are saddened by the loss of life from tornadoes across the country this year, and we continue to work very hard, every day, to provide the right information in time to help people make the right decisions, no matter what the weather.

**-Darin Figsrsky**

## NWS Raleigh Launches Enhanced Short Term Forecasts

You're heading out to run afternoon errands and want to know if you should bring your umbrella. Or you're going into work early in the morning and wonder if you can eat lunch outside today. Or you'd like to attend that evening concert, but not if it's going to rain. These are just a few of the situations where a detailed, always-updated forecast for your specific area would help in your decision-making. And thanks to a new venture at the Raleigh National Weather Service office, you can easily get the answers to help you plan your day (and night). NWS Raleigh is embarking on a new effort to provide the most accurate, up-to-the-minute

forecast possible. Called the "Enhanced Short Term Forecast", or ESTF, this program focuses on very frequent updates – as often as every 1-3 hours – in which the upcoming 1 to 12 hours of the forecast are adjusted for current conditions and new evaluations of trends and computer model data. By applying the latest advances in high-resolution model output – including fine-scale models run every 1-6 hours at a low 4 kilometer resolution – as well as newer remote sensing technology such as mesonet observations, rapid-scan satellite imagery and products, and Doppler radar data, forecasters can quickly assess the current and expected conditions over the

next several hours and adjust the forecast accordingly. So how can you take advantage of these new, detailed forecasts? Hourly forecasts for your location are available on our web page at <http://www.weather.gov/raleigh>. On the map, simply click on the spot for which you'd like the forecast. From here, scroll down to the bottom, where you'll see "Hourly Weather Graph" under the Additional Forecasts and Information section. Click on this, and you'll see the hour-by-hour forecast of temperature, wind, humidity, clouds, rain chances, and more, for that specific location. Graphical hourly forecasts, will soon (continued on page 10)

## NWS Participates in Got To Be NC Agricultural Festival

The NWS office in Raleigh participated in the Got To Be NC Agricultural Festival from May 20-22 at the NC State Fairgrounds. The festival was a lot of fun and our booth was a big hit! We had nearly 1000 people stop by our booth to ask questions, express their interest in the weather, and to share stories and personal experiences relating to the weather. The most popular demonstration at our booth was the flood plain model, which demonstrates how runoff from a variety of surfaces can affect locations along a creek or river downstream. Although the children seemed to get the most enjoyment out of the demonstration, it was very much an all-ages demo. Adult visitors who ob-

served the demonstration came up with some great questions. The flood plain model really was a valuable teaching tool. The teaching tornado was also popular, as it usually is. We were also able to give those who visited our booth other valuable information on weather safety and the importance of having a NOAA All-Hazards Weather Radio. The AgFest was a great success from the NWS organizational standpoint and we will be looking forward to next year's festival! Thank you everyone who



Forecaster Brandon Dunstan at Got To Be NC Festival

worked at the booth and to all those who stopped by to help make this year such a success.

**-Kathleen Carroll**

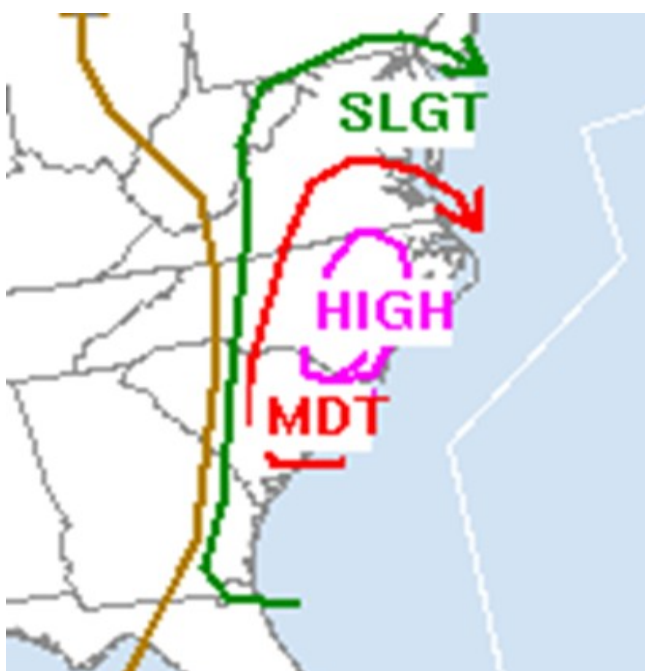




*“At that point we began to see radar signatures typical of tornado outbreaks in the Midwest: classic tornadic supercells with pronounced hooks, strong velocity couplets and rare reflectivity signatures that could only be present in association with tornadic debris being lofted thousands of feet into the air.”*



## April Tornadoes Rock the Triangle (continued from page 1)



**Storm Prediction Center Tornado Outlook for April 16**

the SPC upgraded central North Carolina to a High Risk for severe weather (the first in two decades) on the Day 1 outlook and issued a Particularly Dangerous Situation (PDS) Tornado Watch for all of central North Carolina.

By early afternoon, a line of thunderstorms began to approach the western Piedmont and initial expectations were that the line would progress across central North Carolina producing widespread damaging winds and a few tornadoes associated with embedded supercells. This scenario unfolded as expected in the Triad and northern Piedmont where severe thunderstorm and tornado warnings were issued as the line progressed eastward. However, the nature of the event

changed dramatically as the line approached the Triangle. Instead of a well-defined squall line with em-

bedded supercells, the line itself evolved into several discrete supercells separated by roughly 20-30 miles. While it is not unusual to see discrete supercells growing upscale with time and evolving into a squall line, it is unusual to see a squall line evolving into discrete supercells. At that point we began to see radar signatures typical of tornado outbreaks in the Midwest: classic tornadic supercells with pronounced hooks, strong velocity couplets and rare reflectivity signatures that could only be present in association with tornadic debris being lofted thousands of feet into the air.

One of the aforementioned supercells developed in Moore county shortly after 230 pm EDT. The supercell rapidly intensified, and a

URGENT - IMMEDIATE BROADCAST REQUESTED  
TORNADO WATCH NUMBER 150  
NWS STORM PREDICTION CENTER NORMAN OK  
1205 PM EDT SAT APR 16 2011

THE NWS STORM PREDICTION CENTER HAS ISSUED A  
TORNADO WATCH FOR PORTIONS OF

CENTRAL AND EASTERN NORTH CAROLINA  
CENTRAL AND EASTERN SOUTH CAROLINA  
SOUTHERN VIRGINIA  
COASTAL WATERS

EFFECTIVE THIS SATURDAY AFTERNOON AND EVENING FROM 1205 PM UNTIL  
900 PM EDT.

...THIS IS A PARTICULARLY DANGEROUS SITUATION...

DESTRUCTIVE TORNADOES...LARGE HAIL TO 2 INCHES IN DIAMETER...  
THUNDERSTORM WIND GUSTS TO 70 MPH...AND DANGEROUS LIGHTNING ARE  
POSSIBLE IN THESE AREAS.

THE TORNADO WATCH AREA IS APPROXIMATELY ALONG AND 95 STATUTE  
MILES EAST AND WEST OF A LINE FROM 30 MILES SOUTH SOUTHEAST OF  
CHARLESTON SOUTH CAROLINA TO 60 MILES NORTH NORTHEAST OF SOUTH  
HILL VIRGINIA. FOR A COMPLETE DEPICTION OF THE WATCH SEE THE  
ASSOCIATED WATCH OUTLINE UPDATE (WOU564 KNWS WOU0).

REMEMBER...A TORNADO WATCH MEANS CONDITIONS ARE FAVORABLE FOR  
TORNADOES AND SEVERE THUNDERSTORMS IN AND CLOSE TO THE WATCH  
AREA. PERSONS IN THESE AREAS SHOULD BE ON THE LOOKOUT FOR  
THREATENING WEATHER CONDITIONS AND LISTEN FOR LATER STATEMENTS  
AND POSSIBLE WARNINGS.

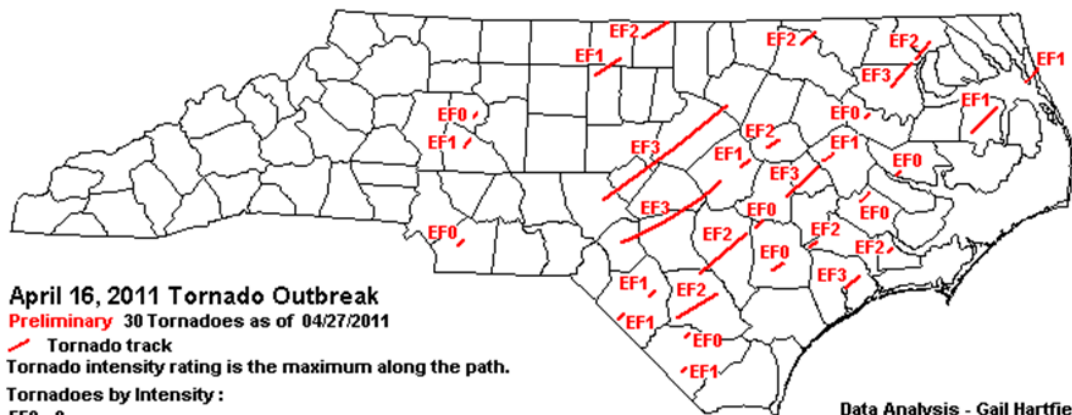
**Particularly Dangerous Situation Tornado Watch**



tornado warning was issued at 243 pm for Moore, Lee and Chatham counties. Given the rapid motion of the storm, at 312 pm a new tornado warning was issued downstream to include Wake, Harnett and Durham counties. As the storm moved northeast through central Lee county it further intensified, and we began to receive

By that time, several other tornado warnings were in effect for additional supercells that had developed, and it was becoming apparent that a historic tornado outbreak was under way. Damage reports persisted as the aforementioned storm exited Lee county and moved northeast through Holly Springs in southwestern Wake county.

proaching tornado imminent, the remaining meteorologists in operations joined the rest of the staff in shelter. After 5 minutes in shelter it became apparent that the office had been spared a direct hit (by roughly 2 miles). We then returned to operations, regained control from Blacksburg and resumed where we had left off.



#### April 16, 2011 Tornado Outbreak

**Preliminary** 30 Tornadoes as of 04/27/2011

— Tornado track

Tornado intensity rating is the maximum along the path.

Tornadoes by Intensity:

EF0 - 8

EF1 - 9

EF2 - 8

EF3 - 5

Data Analysis - Gail Hartfield

Graphic - Brandon Vincent

NWS Raleigh, NC

[www.weather.gov/raleigh](http://www.weather.gov/raleigh)

reports of possible fatalities and significant damage in the Sanford area, including the complete destruction of a Lowe's hardware store. The nature of the damage reports suggested that the supercell in question was likely producing a strong to violent tornado (EF3 or higher). Given environmental conditions supportive of long-track tornadoes and a confirmed tornadic supercell approaching Wake county from the southwest, we quickly realized that highly populated areas (including Raleigh) could be directly impacted, and the thought, "worst-case scenario", came to mind. Once a damaging tornado had been confirmed, it was decided that "Tornado Emergency" wording was appropriate in follow-up statements as the storm rapidly approached Wake county.

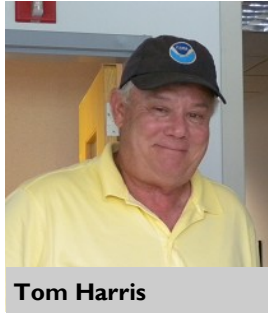
Soon thereafter, it was evident that the tornado would directly affect southern and eastern portions of Raleigh, including NCSU's Centennial Campus where the NWS office is located. As the storm approached, the majority of the staff on shift at the NWS in Raleigh was directed to seek refuge in the tornado shelter. Three meteorologists remained in operations to issue additional tornado warnings and to update severe weather statements one last time before taking shelter and handing back-up responsibility over to the NWS in Blacksburg, VA. Shortly thereafter we lost commercial power (backup generators kept all necessary equipment running) and strong northeasterly inflow was observed outside in the parking lot. At that point, with the ap-

Warning operations continued through the remainder of the afternoon until all storms had exited NWS Raleigh's area of responsibility. The historic tornado outbreak ended in central North Carolina by 7 pm EDT Saturday evening, roughly 6 hours after it began. This was only the beginning of the end, though, as days of damage surveys, follow-up reports and information requests were fulfilled. Educating the public on tornado safety and the events of the 16th continue to this day, in the hopes of increasing preparedness for future outbreaks.

**-Brandon Vincent**



## Electronic Technician Tom Harris Retires After 38 Years of Service



**Tom Harris**

Electronic Technician Tom Harris retired from the National Weather Service on May 31 after more than 38 years of service to his country. Tom initially served for 22 years in the military, stationed in many locations around the world, including Vietnam. There, he was distinguished with many awards, including the Vietnam Service Medal, the Republic of Vietnam Gallantry Cross, the Meritorious Service Medal, and four

Air Medals. Tom then moved on to the private industry, where he spent several years as a contractor for Unisys performing quality assurance for a new radar, the WSR-88D, in the early 1990s. Tom's growing expertise in the radar field led him to Hastings, NE in 1995, where he joined the National Weather Service as an Electronics Technician. In 1998, Tom came to the Raleigh, NC office where he remained until his recent retirement. In his time at the Raleigh office, Tom was a leader as the Environmental Focal Point, promoting a strong Environment, Safety and Health program to help provide for a safe working environment for the National Weather Service staff

and its visitors. Tom also actively supported student training in cooperation with North Carolina State University, leading an extensive annual tour of the WSR-88D located in Clayton, NC. As the lead radar technician, Tom spent countless hours doing preventative and corrective maintenance on the radar, sometimes during hazardous weather at all times of the day. His dedication was greatly appreciated by the staff at the National Weather Service in Raleigh. In his retirement, Tom plans to stay in the Raleigh area, relaxing and working on his already pretty good golf game. His former coworkers wish him all the best in the new chapter of his life.

—**Barrett Smith**



**Morgan Brooks**



## NCSU Student Intern Morgan Brooks Promoted To NWS Milwaukee

Since the day she arrived at WFO Raleigh, Morgan Brooks hit the ground running, learning what it takes to make a career in the National Weather Service. As an NC State student, Morgan was selected to join WFO Raleigh as part of the Student Career Experience Program (SCEP). As a SCEP Morgan was able to work a couple of shifts per week at the office while finishing her Bachelor of Science degree in Meteorology. Morgan fit right from the day she arrived. She quickly learned the routine duties while on shift and began helping out with other projects around the office, including a GIS study involving lightning data.

Morgan helped out with several outreach activities, including being the primary contact for a career fair at NC State and participating in Stormfest at the Raleigh Science Museum. Here at WFO Raleigh, we knew Morgan could handle anything we taught to her. What we didn't realize were the many things that she could teach us along the way. First of all, Morgan is about as genuine a person can get, walking in every day with a smile on her face and treating others the way she would want to be treated. She is compassionate, taking others for who they are and never putting herself above anyone. Well mannered and well spoken, Morgan is a team player and a fantastic

communicator, two traits needed to be successful in this organization. Foreshadowing her future successes which are sure to be vast, Morgan was recently offered a full time position at the NWS forecast office in Milwaukee, WI. Morgan has accepted this offer, although with reservations due to the fact that she currently does not own a winter coat. Morgan will leave us in July and our loss here at the office is the Agency's gain. While she was here for only a short time at WFO Raleigh, future student interns at this office have never had such big shoes to fill. From all of us here at WFO Raleigh, good luck Morgan! You will be missed!

—**Ryan Ellis**



## WCM Jeff Orrock Promoted to MIC of WFO Wakefield

The NWS Raleigh family is saying goodbye to one of its own this summer. After eight and a half years in Raleigh, Warning Coordination Meteorologist Jeff Orrock was recently selected as the new Meteorologist-in-Charge of

City, NC in 1998, where he was promoted to Warning Coordination Meteorologist in 2000. Jeff arrived in Raleigh as the new WCM in January 2003, right after one of the most devastating ice storms in the state's his-

emergency managers, seeing and talking those who had lost everything and feeling the despair people were facing after weeks of flooding." He refers to the April 2011 tornadoes as the "big event we always plan for", citing the excellent service and coordination with partners before, during, and after the event.

Asked what Jeff will miss most about Raleigh, he says it's "The people and collaboration. There is likely no better place to be a WCM. The staff is outstanding and has developed a great ability of balancing science and service. Our partner agencies, from the media to NCDOT, USGS, the NC Division of Air Quality, Corps of Engineers, RDU, military, Red Cross, schools, and of course

emergency management, are excellent at all levels and have always been open to working with the NWS. Our products and services have improved because of the collaborations. People working together and always moving forward is what makes the difference there."

Jeff is looking forward to the new challenges that the MIC job will bring. By applying everything he has learned during his 17 years in the NWS, Jeff will strive to help "lead and cultivate a shared vision among the staff and our partners". We at WFO Raleigh will certainly miss Jeff, but we wish him all the best in this new venture.

**-Gail Hartfield**



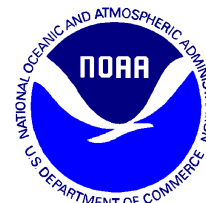
**Jeff Orrock**

the NWS office in Wakefield, Virginia. In his years in Raleigh, Jeff has left his mark in many ways – from forming close ties to the North Carolina Emergency Management community, to instituting online briefings, and providing countless interviews and weather updates to school and transportation officials. Jeff will be greatly missed not only at NWS Raleigh but across North Carolina.

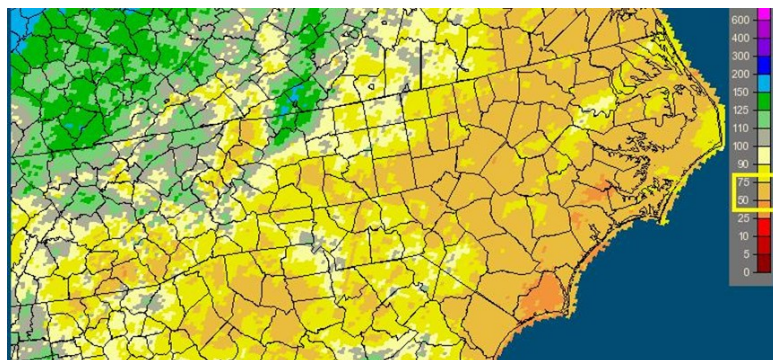
After Jeff received his Bachelor's degree from Florida State University in 1994, he began his NWS career at the Weather Service Office in Pensacola, FL. In 1997 he transferred to NWS Austin/San Antonio, TX, and then went to NWS Morehead

tory crushed the Triangle area under a thick layer of ice. Trying to find a new house in the area for him and his family, Jeff toured several houses that were without power weeks after the storm – a quick introduction to the challenges of central North Carolina's weather.

Jeff's tenure in North Carolina has been marked by several major weather events, including Hurricane Floyd in 1999, the busy tropical season of 2004, the Christmas snowfall of 2010, and, most recently, the April 2011 tornado outbreak. Jeff still carries many vivid memories about working after Hurricane Floyd, including "actually being out there in the floods working with



# Drought Looms Over Central North Carolina



**Percentage of Normal Rainfall for the Year**

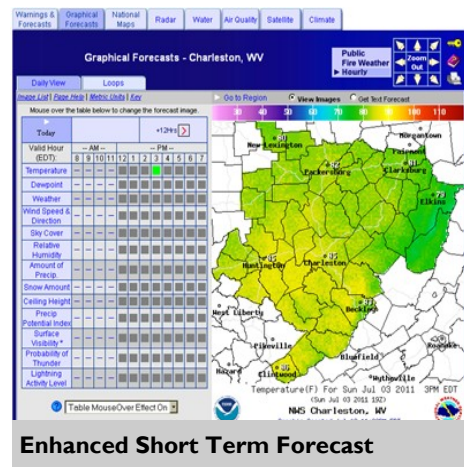
Drought conditions across central NC have gradually worsened from late Spring into early Summer. Rainfall events for the past couple of months simply have not been widespread or heavy enough to provide sustained relief, and our rainfall deficit has been gradually increasing as temperatures soared and water demand increased. For the year-to-date, our rainfall has been less than 75 percent of normal over most of central NC, with the exception of the western piedmont (the Yadkin/Pee Dee river basin), where the deficit is smaller. Drought im-

pacts have not been particularly evident to most folks up to this point, because conservation efforts over the winter were successful at maintaining public water supplies. Stream flows and groundwater levels have been consistently below normal for a number of months, however, resulting in very low recharge into our reservoirs and groundwater aquifers. The spotty nature of our rainfall thus far during the growing season has been particularly hard on the corn crop, and nearly 50 percent of the corn crop across the state is in poor or very poor condition. This

percentage is, of course, higher in the east, which is suffering from severe drought and also has more acreage planted in corn. At this point, we don't have any climatological indicators upon which to base a longer range precipitation or temperature forecast. The tropical weather outlook is for an above-normal number of tropical cyclones, which are very effective 'drought-busters', but individual storm development and track cannot be forecast beyond a few days. If we have a normal summer rainfall and temperature pattern, we should expect drought conditions to gradually worsen due to continued strong demand from municipal and agricultural water users. Fortunately, there is adequate storage in our larger water supply reservoirs (Jordan and Falls Lakes) to get us into September or beyond.

**-Mike Money Penny**

## Short Term Forecasts (continued from page 5)



**Enhanced Short Term Forecast**

be available as well. And later this summer, we'll be highlighting these hourly forecasts for major population centers like Raleigh, Fayetteville, Greensboro, and other cities on the top of our home page – all to make it easier and faster to find the information you need. Watch for these changes on our web page later this summer.

**- Gail Hartfield**



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